

**Notice of Allowability**

Application No.

10/630,077

Examiner

Nikita Wells

Applicant(s)

BARKER ET AL.

Art Unit

2881

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Application filed 28 July 2003.
2. ☒ The allowed claim(s) is/are 1-30 and 34-43.
3. ☒ The drawings filed on 28 July 2003 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  6. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
Paper No./Mail Date 072604
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413),  
Paper No./Mail Date 072604.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_.

Nikita Wells  
Primary Examiner  
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## **Detailed Action**

### ***Examiner's amendment***

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with John Gunther on July 26, 2004.

Claims 31-33 have been canceled.

Claims 28 and 41 are amended as follows:

In claim 28, on line 4, the following is inserted after "containing a": --positron having a single positive charge bound to ordinary matter having a single negative charge.--.

In claim 41, on line 1: "gamma ray" has been deleted.

The Applicant agreed to amend the above claim in order to proceed with the allowance of the rest of the claims of this Application.

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### ***Allowable Subject Matter***

2. Claims 1-30 and 34-43 are allowed.
3. The following is an examiner's statement of reasons for allowance:

With respect to the independent claim 1, prior art fails to disclose or make obvious, an anti-matter storage device for electrically neutral excited species of anti-matter or exotic matter, said anti-matter storage device comprising a three-dimensional or two-dimensional photonic

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bandgap (PBG) structure containing at least one PBG cavity in said PBG structure, said PBG cavity comprising a cavity wall embedded in said PBG structure and surrounded thereby and containing a quantity of species selected from the group consisting of excited electrically neutral atoms and molecules of anti-matter, and excited electrically neutral atoms and molecules of exotic matter.

With respect to the independent claims 11, 17, and 38, prior art fails to disclose or make obvious, in addition to the accompanying features of the claims, a method of capturing or exciting anti-matter, said method comprising: providing an anti-matter capture device comprising a three-dimensional or two-dimensional photonic bandgap (PBG) structure containing at least one PBG cavity therein, said PBG cavity capable of containing a quantity of species selected from the group consisting of excited electrically neutral atoms and molecules of anti-matter, and excited electrically neutral atoms and molecules of exotic matter.

With respect to the independent claims 24, and 34, prior art fails to disclose or make obvious, in addition to the accompanying features of the claims, a state of anti-matter comprising a three-dimensional or two-dimensional photonic bandgap (PBG) structure containing an array of PBG cavities in said PBG structure.

~~With respect to the independent claims 42 and 43, prior art fails to disclose or make~~  
obvious, in addition to the accompanying features of the claims, a particle beam comprising excited electrically neutral atoms or molecules of anti-matter or excited electrically neutral atoms or molecules of exotic matter emitted by a photonic bandgap (PBG) structure containing at least one PBG cavity therein.

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The dependent claims 2-10, 12-16, 18-23, 25-30, 35-37, and 39-41, are allowable by virtue of their dependence upon the independent claims 1, 11, 17, 24, 34, and 38, respectively.

### ***Conclusion***

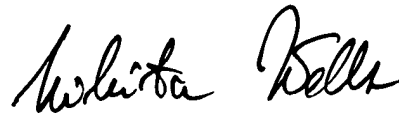
4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. L. Kasprowicz (6,606,370 B1) and Smith et al. (6,160,263) disclose a system for the storage and transportation of anti-matter. E.A. Hessels (6,163,587) discloses a process for the production of anti-hydrogen. Rich et al. (4,864,131) disclose a positron microscope system utilizing image enhancement to overcome problems associated with low positron source flux. Shi et al. (2003/0048993 A1) disclose the use of a photonic crystal structure for efficient coupling to photonic crystal waveguides, but fail to disclose any reference to anti-matter.

5. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nikita Wells whose telephone number is (571) 272-2484. The examiner can normally be reached on 8:30 AM- 5:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Lee can be reached on (571) 272-2477. The central fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

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7. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read "Nikita Wells". The signature is fluid and cursive, with the first name "Nikita" and the last name "Wells" clearly distinguishable.

Nikita Wells, Primary Examiner  
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July 26, 2004